Quick Manual of GRID_DATA
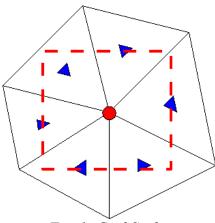
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Functions

1. Lattice Database
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2. Unstructured Databese
    1. Bathymetric (Topo) data Mapping from unstructired point data (.xyz)
3. Grid Smoothing

Mapping Method

Grid_data map the values onto F.E. Grid using the GIS database points inside of "Grid Scale". Grid scale is defined at every node based on the max/min position of centroid of elements which are around a node and this node itself shown as Fig.1.

Fig. 1: Grid Scale.

Grid_data has three kind of mapping schemes (Averaging, Highest point, Nearest point), which are switched by Flag_value on input Grid.

1. Averaging
   Flag_value: -999.0 (x1), -950.0 (x2), -960.0 (x4), -970.0 (x8)
    This scheme evaluate the average to count the GIS database points which are inside of Grid scale. And this scheme can use different Grid scale size classified by flag_value.
2. Highest point
   Flag_value: -888.0
    This scheme pick up the highest point of GIS database inside of Grid_scale.
3. Nearest point
   Flag_value: -777.0
    This scheme pick up the nearest point of GIS database inside of Grid_scale.

Algorithm of each function
1. Lattice Database
   1. Bathymetric data mapping from LIDAR data
      This procedure map the nodal bathymetric(topo) data which has flag_value using LIDAR data. This procedure needs some parameters and LIDAR data list in " LIDAR.list".
      Format of LIDAR.list is;

      4000
      ../data/fort.14
      ../data/test.rec
      20
      ../data/Lidar1.xyz
      ../data/Lidar2.xyz
      …............... total 20 files.

      The first line means memory usage limit for this program in MB(Mega Bytes). This parameter depends on the size of database workspace in this program. If you can prepare large memory space for database table, the job will finish fast. The second is the filename of input grid file. If your input grid file name has ".14" or ".grd" as expansion such as "filename.14", the output file name will be "filename1.14" or "filename1.grd". If it have another expansion such as "filename.dat", the output will be "filename.dat1". The third line is the file name of node property history record. Record file will be used to define the priority of the database. The forth is total number of Lidar data files, and followers are name of Lidar filename.
      All data files must have same nodal interval.

   2. Bathymetric (Topo) data Correction using GAP data
      This procedure modify the nodal value that the node (is classified as your table) or (has the value from LIDAR database and it is greater than -0.8[unit]).
      This procedure needs a table classified the GAP data to bathymetry. In this table, the first class must be classified as "**Water**".
      GAP database have to be converted to binary format using this program (binary filename will be "*your_GAP_filename*.binary"). Once you have converted GAP database using this program, you do not need convert the database again, maybe, even if you change your computer environment (i.e. compiler, operating system).
      The data correction will be obey your table, except for the case with the nearest point is classified as "Water". If the nearest point is "Water", this program will classify the bathy data using WaterRatio(Ratio of water points in Grid scale) as follows;

1.00 >= Water Ratio > 0.99 ….............	1.2 [unit]	
0.99 >= Water Ratio > 0.90 ….............	1.0 [unit]	
0.90 >= Water Ratio > 0.80 ….............	0.8 [unit]	
0.80 >= Water Ratio > 0.70 ….............	0.6 [unit]	
0.70 >= Water Ratio > 0.60 ….............	0.4 [unit]	
0.60 >= Water Ratio ….............	use your table.	

      * The unit of depth is depended on your grid.
      * The flag_value(i.e. the mapping method) is used same of LIDAR procedure recorded in record file, if you use the record file.Bathymetric (Topo) data Mapping from USCR

data (.xyz)

3. Bathymetric (Topo) data Mapping from USCR data (.xyz)
   This procedure map the nodal bathymetric data which has flag_value or wet node(z > border_depth) from Procedure 1. or 2. on record file.
   * default value of border_depth is 1.2. You can edit this parameter "bdepth" in module parameter at the beginning of program.
   others are almost same as Procedure 1. This procedure needs control file "USCR.list".

4. Bathymetric (Topo) data Mapping from ETOPO data (.xyz)
   This procedure is almost same as Procerude 3., but this procedure don't change the vales from another databases on record file. This procedure needs control file "ETOPO.list".

5. Mannigs n Mapping from GAP data
   This procedure map the Mannings n from GAP data. You have to make the table of database value to Mannings n.

- Record file
  In record file, the first line is total number of nodes(N_node) of grid. After this, there are N_node lines with a pair of digits. The first digit means from which database the value of this node came. (1.LIDAR, 2.GAP correction, 3.USCR, 4.ETOPO.). The second digit means which mapping method was used. (1. Averaging(x1), 2. Highest, 3.Nearest, 4.Averaging(x2), 5.Averaging(x4), 6.Averaging(x8)). These data are used to judge the priority of database.

2. Unstructured Database

1. Bathymetric (Topo) data Mapping from unstructured point data (.xyz)
   This procedure map the nodal bathymetry data which has flag_value using unstructured (arbitrary) points database.

3. Grid Smoothing

This procedure do smoothing for nodal value listed in 'node list' file usig Least-Square approach (i.e. the weighted averaging for area of element). In the node list file, the first line is total number of nodes will be done smoothing, and follower is the it's node number.

All details are shown in "Griddata_PT03-2.F90"